

## ORIGINAL ARTICLE

## Prevalence of Sexually transmitted infections in females attending community health centres in the rural area of Dehradun, India

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### Abstract

**Background:** Sexually transmitted infections (STIs) and reproductive tract infections (RTIs) are major public health concerns, particularly among women. **Aims & Objectives:** The primary aim of this cross-sectional study was to determine the prevalence of laboratory-confirmed RTIs/STIs in a sample of 228 self-reported females aged 14-55 visiting community health centers. Additionally, the study sought to explore the correlation between these infections and clinical features. **Material & Methods:** The study included 228 females aged 14-55 visiting the STI clinic in Doiwala Block, Dehradun. Vaginal/cervical swab and blood specimens were collected after obtaining informed written consent. Specimens were processed at HIMS using standard microbiological methods to diagnose various STDs. **Results:** The study found that 50% of females attending community health centers had laboratory-confirmed RTIs/STIs. Bacterial vaginosis was the most prevalent infection (25.9%), followed by candidiasis (24.6%), Trichomonas vaginalis (2.6%), and syphilis (1.3%). Neisseria gonorrhoeae and Chlamydia trachomatis were not detected. Notably, there was a significant association between the prevalence of RTI/STI and the literacy status, occupation, and socioeconomic status of the respondents. **Conclusion:** This study highlights a high prevalence of RTIs/STIs among females in a rural area of Doiwala Block, Dehradun. Bacterial vaginosis and candidiasis were the most common infections. The findings underscore the importance of targeted interventions and education to address this public health issue, particularly among women with lower socioeconomic status and literacy levels.

### Keywords:

Community Health Centres; Bacterial Vaginosis; Candidiasis; Neisseria Gonorrhoeae

### Introduction

Sexually transmitted infections have led to serious health problems in females of the reproductive age group and also hold the second position in public health problems in developing countries (1). RTIs/STIs are associated with various health issues including infertility, ectopic pregnancy, pelvic inflammatory diseases, and adverse pregnancy outcomes such as miscarriage, stillbirth, preterm birth, and congenital infections, and also increase the risk of HIV transmission (2). The infection commonly depends upon the risk factors including; behavioral factors such as daily cleanliness, hygiene during menstruation and unprotected sex, awareness about RTI,

early onset of sexual activity, and false beliefs; Socio-demographic factors are marital status, education, employment, husband literacy; socioeconomic status and medical factors which includes lack of access to health care facilities (3).

In 2020, WHO estimates 374 million new infections with one of four STIs, namely, chlamydia (129 million), gonorrhoea (82 million), syphilis (7.1 million), and trichomoniasis (156 million)(4). Indian Council of Medical Research (ICMR) conducted a community-based study during the year 2002-2003 and reported that 6% of the adult population has one or more STI/RTI(5). A District Level Household Survey-3 reported an 18.3% prevalence of symptoms of RTI/ STI (6). Various community-based

studies in India have shown the prevalence of RTIs to range from 39% to 84% (7,8).

The syndromic approach method is recommended by WHO for the treatment of RTIs/STIs which is the widespread method, especially in developing countries due to its cost-effectiveness (7). The prevalence of these infections is quite high in the community, but very few communities and laboratory-based studies support this. To know the exact prevalence of RTIs/STIs in the community laboratory support along with a syndromic approach is required, it will also decrease the use of medicine and treatment failure rates or recurrent infections. Therefore, microbial findings are necessary to cure the infection and spread of STDs in society.

The present study focuses on the prevalence of laboratory-confirmed RTI/STI in a self-reported female attendee in STI clinic of community health centres in a rural area of, Doiwala Block, Dehradun.

### Aims & Objectives

1. To determine the prevalence of laboratory-confirmed RTIs/STIs in a sample of self-reported female attendees at an STI clinic in a rural area.
2. To investigate the correlation between laboratory-confirmed RTIs/STIs and clinical symptoms in the study population, helping identify potential associations.
3. To assess the impact of various risk factors, including behavioral, socio-demographic, and medical factors, on the prevalence of RTIs/STIs among the target population.

### Material & Methods

**Study Population:-** The study population consisted of 228 patients exhibiting signs and symptoms of Reproductive Tract Infections (RTIs) and Sexually Transmitted Infections (STIs). **Study Area:** The research was conducted in the community health centers of Doiwala Block, Dehradun.

**Study Duration:** The study spanned from June 2021 to December 2021. **Sample Size Calculation:-** The sample size of 228 patients was determined based on the number of individuals presenting with symptoms of RTIs/STIs and attending the STI clinic during the study period (Convenience sampling method). **Inclusion**

**Criteria:** Patients with signs and symptoms of RTIs/STIs were eligible for inclusion in the study. **Exclusion Criteria:**

No sign and symptom of RTIs/STIs. **Strategy for Collection:-** Patients were enrolled at the STI clinic, and relevant samples were collected from them for further analysis. These samples included blood and two vaginal swab/cervical samples. **Working Definition:-** Various laboratory methods and criteria were employed for the diagnosis of specific infections, such as *Neisseria gonorrhoeae*(9), Candidiasis, Trichomoniasis, Bacterial vaginosis, Chlamydia trachomatis, Syphilis, Hepatitis B virus, Hepatitis C virus, and HIV according to institutional lab SOPs. **Ethical Approval:-** The study was conducted

with prior approval from the Swami Rama Himalayan University (SRHU) Ethics Committee. **Consent:-** Informed written consent was obtained from all study participants, ensuring their willingness to participate in the research. **Data Analysis - Software:-** Data management and statistical analysis were carried out using SPSS software version 20. The analysis involved the representation of qualitative variables in the form of frequency and percentage, while quantitative variables were expressed as mean  $\pm$  SD. Associations between categorical variables were evaluated using non-parametric tests such as chi-square and Fisher exact test, with statistical significance set at p-value < 0.05.

### Results

The study shows that among 228 women, the prevalence of RTIs/STIs varies with different socio-demographic factors. Notable findings include a significant association between lower literacy levels and higher RTI/STI rates ( $p < 0.05$ ). Housewives/unemployed women were more likely to have RTIs/STIs than working women ( $p < 0.05$ ). The socio-economic scale also played a role, with Class II and Class V having higher odds of RTIs/STIs (Table 1). Clinical symptoms such as vaginal/cervical discharge were prevalent in 98.7% of the subjects (Table 2). Bacterial vaginosis and candida species were the most common etiological factors (Table 3). Mixed etiology was detected in 5.7 % of cases; most common is Bacterial vaginosis with candidiasis 69% (Figure 1)

### Discussion

The current cross-sectional study was conducted in community health centres in the rural area of Doiwala Block, Dehradun. Total 228 patients of age between 14-55 years were enrolled in this study. In our study vaginal discharge was the most common symptom which is similar to previous studies (10-13). 66.7% of females had vaginal discharge with lower abdominal pain and 33.3% of females had vaginal discharge without abdominal pain. Our study showed that the etiological prevalence of RTIs/STIs in symptomatic females is 50% (114/228), similar results were seen in the study conducted by Passey M *et al* (59%), Garg S *et al* (56%) and Kosambiya JK *et al* (50.3%) where the laboratory-confirmed prevalence was very high (14-16). In a study conducted by Ray K *et al* where the prevalence of laboratory-confirmed RTI/STI infection was 36.8% which was very low compared to the present study due to inappropriate, inadequate, and indiscriminate use of antimicrobials in their study (17). In our study, the maximum prevalence was found in the age group of 26-35 years (49.12%), which is similar to the finding reported by Sharma S *et al* where the prevalence was highest in the age group of 25-34 (63.6%) (13).

In the present study Bacterial vaginosis (25.9%) was the commonest infection present in the females followed by candidiasis (24.6%). Similar findings were seen in a study conducted by Saharan S (21% Bacterial vaginosis and

20.3% candidiasis) (18), Garg S *et al* (41% Bacterial vaginosis and 12.4% candidiasis) (15), and Das S *et al* (67.4% using Amsel criteria) (19). *Trichomonas vaginalis* was observed in 2.6% of cases which was similar to the study conducted by Saharan S (3%) (18), Ray K *et al* (2% urban, 2.3% rural) (20), and Choudhary S (4.7%) (21). Bang RA *et al* conducted a community-based study on a rural Indian woman where the prevalence of RTIs was very high (Bacterial vaginosis 62%, candidiasis 34%, *Trichomonas vaginalis* 13.98%, and syphilis 10.5%) (7). No case was found to be positive for *Neisseria gonorrhoea*, which was similar to the finding of a study conducted by Garg S *et al* (10). In our study, none of the patients showed presence of chlamydial IgG antibodies whereas in the study conducted by Malik *et al* in infertile females, chlamydia IgG prevalence was found to be 7.5% (22). HIV prevalence in the study was 0.4% and the prevalence of syphilis was 1.3%. Mixed etiology was detected in 5.7 % of cases, Narayan khedkar A *et al* reported 6.4% of mixed etiologies (12).

This study indicates a statistically significant association between the prevalence of RTI/STI with the literacy status, occupation of the respondent, and socioeconomic status. The p-value was found to be significant in illiterate females (OR=1, P=0.00) and the females educated upto 12<sup>th</sup> class (OR=0.14, P=0.001), illiterate females had poor knowledge about reproductive tract infections as well as poor health-seeking behavior and the females educated up to 12<sup>th</sup>, were more concerned about their health. Hence, they are doing laboratory tests related to STI/RTI and getting detected. The majority of females who had suffered from RTI/STI were housewives/ unemployed (OR=1, P= 0.03) again found to be statistically significant, this might be due to poor hygiene, education status, and partners not using contraceptive measures. In this study, there is a significant association between socioeconomic class II (OR=1, P=0.003) and RTI/STI, this may be due to the long-distance relationship with the partner which encourages the females in sexual activities with more than one partner. Moreover, the male partner who are in travelling jobs carries back the infections and exposes their female partner to sexually transmitted infections. The syndromic approach method may not be an effective method for vaginal discharge syndrome. A study was conducted by Tann CJ *et al* on pregnant females to measure the prevalence of RTI in pregnancy and to evaluate the syndromic management approach in effectively targeting *Bacterial vaginosis* and *Trichomonas vaginalis*. They found that the sensitivity for detecting *Bacterial vaginosis* (50.0%) and *Trichomonas vaginalis* (66.7%) by syndromic management was not very good (23).

## Conclusion

The results of this study lay emphasis on etiological diagnosis along with the signs and symptoms which will be

helpful in the selection of appropriate antimicrobial therapy. Over diagnosis and overtreatment of the patients lead to the wastage of antibiotics and the emergence of antimicrobial resistance. It also puts financial burden on the health sector. Therefore, laboratory testing should be recommended over the syndromic approach method. Concurrent treatment of the spouse is very difficult due to lack of knowledge as well as lack of cooperation from the husband (17). Therefore, awareness about sexually transmitted diseases during family planning program and in adolescent program is required along with their control measure and treatment which will help to control the spread of infection in the community.

## Recommendation

Health Education and Awareness, accessible healthcare system, safe sexual practices, encourage partner Involvement, rethink Syndromic Approach, further research and Monitoring to understand the evolving trends of RTIs/ STIs and antimicrobial Stewardship strengthening to prevent drug resistance

## Limitation of the study

First, the sample size was relatively small and drawn from a specific rural area, potentially limiting the generalizability of the findings to broader populations. Second, the cross-sectional design, cannot establish causality or account for temporal changes in infections. Third, the study focused solely on the Doiwala Block, which may not adequately represent the diversity of STI/RTI prevalence in different geographic regions. Finally, the study lacks longitudinal data, making it impossible to capture changes in infection rates over time or assess the impact of interventions.

## Relevance of the study

This study significantly contributes to our current knowledge of reproductive tract infections (RTIs) and sexually transmitted infections (STIs), particularly in rural areas of developing countries. It offers valuable insights into the prevalence, etiology, and associated risk factors for these infections, shedding light on the specific patterns observed in the Doiwala Block, Dehradun. By highlighting the significance of laboratory-confirmed diagnoses over syndromic approaches, the study underscores the importance of accurate testing and tailored treatment to combat RTIs and STIs effectively. Moreover, this research underscores the pressing public health issue posed by these infections, their impact on women of reproductive age, and their potential consequences, such as infertility and HIV transmission. The study's findings emphasize the need for increased awareness, education, and preventive measures, especially for populations with lower literacy levels and limited access to healthcare.

## Authors Contribution

All authors have contributed equally

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**References**

- National AIDS Control Organization. National Guidelines on Prevention, Management, and Control of Reproductive Tract Infections, Including Sexually Transmitted Infections. Government of India; 2007.
- Nagarkar A, Mhaskar P. A systematic review on the prevalence and utilization of health care services for reproductive tract infections/sexually transmitted infections: Evidence from India. *Indian Journal of Sexually Transmitted Diseases and AIDS*. 2015;36(1):18.
- Rowley J, Berkley S. Sexually transmitted diseases. In: Murray CJL, Lopez AD, editors. *Health Dimensions of Sex and Reproduction (Global Burden of Disease and Injury Series, Volume III)*. Harvard University Press; 1998:19-110.
- World Health Organization (WHO). Sexually Transmitted Infections (STIs) - Fact Sheet. Available from: ([https://www.who.int/news-room/fact-sheets/detail/sexually-transmitted-infections-\(stis\)](https://www.who.int/news-room/fact-sheets/detail/sexually-transmitted-infections-(stis))). (Accessed on 2023-09-25).
- STI/RTI Services. National AIDS Control Organization, Ministry of Health and Family Welfare, Government of India. Available from: <http://www.naco.gov.in/sti-rti-services>. (Accessed on 2023-09-25)
- District Level Household Survey-3, 2007-2008. Ministry of Health and Family Welfare, Mumbai, India: International Institute for Population Sciences; 2010.
- Bang RA, Baitule M, Sarmukaddam S, Bang AT, Choudhary Y, Tale O. High prevalence of gynecological diseases in rural Indian women. *The Lancet*. 1989;333(8629):85-8.
- Latha K, Kanani SJ, Maitra N, Bhatt RV, Senapati SK, Bhattacharya S, et al. Prevalence of clinically detectable gynecological morbidity in India: Results of four community-based studies. *Journal of Family Welfare*. 1997;43:8-16.
- World Health Organization. *Laboratory Diagnosis of Gonorrhoea*. WHO Regional Publication. South-East Asia, New Delhi, India; 1999.
- Garg S, Bhalla P, Sharma N, Sahay R, Puri A, Saha R, et al. Comparison of self-reported symptoms of gynecological morbidity with clinical and laboratory diagnosis in a New Delhi slum. *Asia-Pacific Population Journal*. 2001;16(2):75-92.
- Tankhiwale SS, Chavan SP. Comparative Study of Syndromic and Etiological Diagnosis of Sexually Transmitted Infections Except Human Immunodeficiency Virus in Sexually Transmitted Infection and Reproductive Tract Infection Clinic Attendees in Central India. *International Journal of Medicine and Public Health*. 2013;3(4).
- Narayankhedkar A, Hodiwala A, Mane A. Clinicopathological Characterization of Infectious Vaginitis Among Women of Reproductive Age Group from Navi Mumbai, India. *Journal of Sexually Transmitted Diseases*. 2015;2015.
- Sharma S, Gupta BP. The Prevalence of Reproductive Tract Infections and Sexually Transmitted Diseases Among Married Women in the Reproductive Age Group in a Rural Area. *Indian Journal of Community Medicine: Official Publication of Indian Association of Preventive & Social Medicine*. 2009;34(1):62.
- Passey M, Mgone CS, Lupiwa S, Tiwara S, Lupiwa T, Alpers MP. Screening for Sexually Transmitted Diseases in Rural Women in Papua New Guinea: Are WHO Therapeutic Algorithms Appropriate for Case Detection? *Bulletin of the World Health Organization*. 1998;76(4):401.
- Garg S, Sharma N, Bhalla P, Sahay R, Saha R, Raina U, et al. Reproductive Morbidity in an Indian Urban Slum: Need for Health Action. *Sexually Transmitted Infections*. 2002;78(1):68-9.
- Kosambiya JK, Desai VK, Bhardwaj P, Chakraborty T. RTI/STI Prevalence Among Urban and Rural Women of Surat: A Community-Based Study. *Indian Journal of Sexually Transmitted Diseases and AIDS*. 2009;30(2):89.
- Ray K, Bala M, Bhattacharya M, Muralidhar S, Kumari M, Salhan S. Prevalence of RTI/STI Agents and HIV Infection in Symptomatic and Asymptomatic Women Attending Peripheral Health Set-Ups in Delhi, India. *Epidemiology & Infection*. 2008;136(10):1432-40.
- Saharan S. A Study of Syndromic and Etiological Approach for the Diagnosis of Reproductive Tract Infections. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2018;7(6):2147-55.
- Das S, Dasgupta A. Community-Based Study of Reproductive Tract Infections Among Women of the Reproductive Age Group in a Rural Community of Eastern India. *Int J Community Med Public Health*. 2019;6:330-6.
- Ray K, Muralidhar S, Bala M, Kumari M, Salhan S, Gupta SM, et al. Comparative Study of Syndromic and Etiological Diagnosis of Reproductive Tract Infections/Sexually Transmitted Infections in Women in Delhi. *International Journal of Infectious Diseases*. 2009;13(6):e352-9.
- Choudhry S, Ramachandran VG, Das S, Bhattacharya SN, Mogha NS. Pattern of Sexually Transmitted Infections and Performance of Syndromic Management Against Etiological Diagnosis in Patients Attending the Sexually Transmitted Infection Clinic of a Tertiary Care Hospital. *Indian Journal of Sexually Transmitted Diseases and AIDS*. 2010;31(2):104.
- Ghosh M, Choudhuri S, Ray RG, Bhattacharya B, Bhattacharya S. Association of Genital Chlamydia trachomatis Infection with Female Infertility: A Study in a Tertiary Care Hospital in Eastern India. *The Open Microbiology Journal*. 2015;9:110.
- Tann CJ, Mpairwe H, Morison L, Nassimu K, Hughes P, Omara M, et al. Lack of effectiveness of syndromic management in targeting vaginal infections in pregnancy in Entebbe, Uganda. *Sexually Transmitted Infections*. 2006;82(4):285-9.

**Tables**

**TABLE 1: - DISTRIBUTION OF RTIS/STIS IN RELATION TO DIFFERENT SOCIO-DEMOGRAPHIC FACTORS.**

Parameter	RTI/STI present	RTI/STI absent	Total (n=228)	Odds ratio (95%CI)	p-value
<b>Age</b>					
16-25	36 (53.7%)	31(46.3%)	67(29.4%)	1	0.65
26-35	54(51.5%)	51(48.6%)	105(46.1%)	1.88(0.5-7.8)	0.39
36-45	18(42.9%)	24(57.1%)	42 (18.4%)	1.45(0.4-5.4)	0.58
46-55	6(42.9%)	8(57.1%)	14 (6.1%)	1.02(0.2-4.2)	0.98
<b>Literacy status</b>					
Illiterate	19(59.4%)	13(40.6%)	32(14%)	1	0.00
Up to 5th grade	13(19.1%)	55(80.9%)	68(29.8%)	0.66(0.2-2.3)	0.51
Up to 12th grade	56(70%)	24(30%)	80(35.1%)	0.14(0.0-0.4)	0.001
Graduate & above	26(54.2%)	22(45.8%)	48(21.1%)	1.195(0.4-3.3)	0.73
<b>Occupation of Female</b>					

Parameter	RTI/STI present	RTI/STI absent	Total (n=228)	Odds ratio (95%CI)	p-value
<b>Housewives/ Unemployed</b>	93(47.2%)	104(52.8%)	197(86.4%)	1	0.03
<b>Working</b>	21(67.7%)	10(32.2%)	31(13.6%)	0.36(0.1-1.0)	0.06
<b>Marital status</b>					
<b>Married</b>	111(5.20%)	110(49.8%)	221(96.9%)	1	0.25
<b>Unmarried</b>	1(33.3%)	2(66.6%)	3(1.3%)	1.24(0.1-13.1)	0.87
<b>Widow</b>	2(50%)	2(50%)	4(1.8%)	0.10(0.0-4.1)	0.23
<b>Religion</b>					
<b>Others</b>	2(20%)	8(80%)	10(4.4%)	1	0.52
<b>Hindu</b>	92(52.2%)	84(47.7%)	176(77.1%)	0.38(0.1-2.5)	0.32
<b>Muslim</b>	20(47.6%)	22(52.4%)	42(18.4%)	1.06(0.5-2.4)	0.88
<b>Socioeconomic scale(modified Prasad Scale in Rs)</b>					
<b>Class II</b>	9(39.1%)	14(16.9%)	23(10.1%)	1	.003
<b>Class III</b>	11(28.9%)	27(71.1%)	38(16.7%)	0.41(0.1-1.4)	0.16
<b>Class IV</b>	44(73.3%)	16(26.7%)	60(26.3%)	0.37(0.1-1.0)	0.05
<b>Class V</b>	50(46.7%)	57(53.3%)	107(46.9%)	2.24(1.0-5.1)	0.06
<b>Obstetric/gynecological risk factor</b>					
<b>IUCD</b>	4(57.1%)	3(42.9%)	7(3.1%)	1.21(0.2-6.5)	0.62
<b>ANC</b>	8(61.5%)	6(42.9%)	14(6.1%)	0.58(0.1-4.5)	0.83

**TABLE 2: DISTRIBUTION OF CLINICAL SIGNS AND SYMPTOMS IN STUDY SUBJECTS**

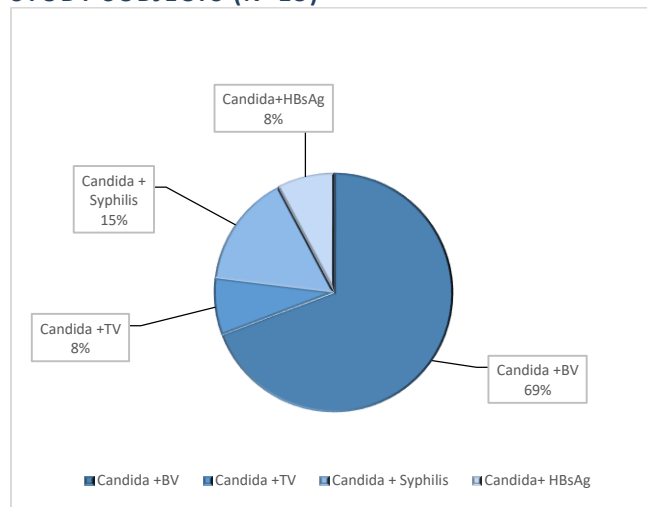
Clinical signs and symptoms	Number	Percentage (%)
<b>Vaginal/Cervical discharge</b>	225	98.7
<b>Foul smell</b>	164	71.9
<b>Itching</b>	153	67.1
<b>Lower abdominal pain</b>	150	65.8
<b>Burning micturition</b>	99	44.4
<b>Lower back pain</b>	22	9.6
<b>Skin lesions</b>	13	5.7
<b>Dyspareunia</b>	7	3.1
<b>Swelling of labia</b>	3	1.3

**TABLE 3: ETIOLOGICAL PREVALENCE OF RTIS/STIS AMONG STUDY SUBJECTS**

Etiology	Test performed	Women (n=228)	
		Num	%
<b>Bacterial vaginosis</b>	pH Whiff test Presence of clue cell.	59	25.9
<b>Candida species</b>	10% KOH mount Gram stain Culture	56	24.6
<b>Trichomoniasis</b>	Wet mount microscopy	6	2.6
<b>Syphilis</b>	RPR and TPHA	3	1.3
<b>HBsAg</b>	Lateral Immunochromatography	2	0.9
<b>HIV</b>	As per NACO guidelines	1	0.4
<b>HCV</b>	Lateral Immunochromatography	0	0
<b>Neisseria gonorrhoeae</b>	Gram stain Culture	0	0
<b>Chlamydia trachomatis</b>	ELISA	0	0

**Figures**

**FIGURE 1 - MIXED INFECTIONS ARE SEEN IN STUDY SUBJECTS (N=13)**



BV= Bacterial vaginosis, TV= Trichomonas vaginalis, HBsAg=Hepatitis B surface antigen